
(U) EXECUTIVE SUMMARY

(U) PURPOSE

In response to the Secretary of the Navy's direction, and in accordance with Chief of Naval Operations (CNO) and Assistant Secretary of the Navy for Research, Development, and Acquisition (ASN(RD&A)) guidance, this report documents the results of the Small Surface Combatant Task Force's efforts to develop and evaluate alternative proposals to procure a "capable and lethal surface combatant generally consistent with the capabilities of a frigate."

(U) FINDINGS

A summary of key findings provided to CNO and ASN(RD&A) and used to inform Department of Navy's response to the Secretary of Defense is provided below.

(U) Operational Perspective

- (U) Eight capability concepts represent the range of operationally acceptable mission alternatives for a small surface combatant.
- (U//FOUO) The Fleet placed the highest value on operating a small surface combatant with multi-mission capabilities in Surface Warfare (SUW) and Anti-submarine Warfare (ASW) including horizon and over-the-horizon surface engagement; Area ASW coverage; continuous air, surface and undersea self-defense; and survivability features to mitigate damage effects. In addition, the Fleet valued a local area defense Air Warfare (AW) mission, but not in lieu of a multi-mission SUW and ASW capability.
- (U//FOUO) A multi-mission SUW and ASW small surface combatant adds capability and flexibility to U.S. naval forces. Force roles and responsibilities include conducting independent operations; participating in SUW Surface Action Groups; participating in ASW Search and Attack Units; protecting High Value Units (HVUs) from surface and undersea threats (HVVU escort); and supporting Carrier Strike Group (CSG) SUW and ASW operations. Providing local area defense AW would add the capability to support HVU air defense escort missions and CSG AW operations.
- (U//FOUO) Ballistic Missile Defense and Land Strike capabilities were not considered viable missions for a small surface combatant. Furthermore, providing Mine Warfare (MIW) reconnaissance and clearance capabilities beyond the initial 32 Littoral Combat Ships (LCSs) and associated MIW mission packages is not required due to projected Fleet MIW capabilities in the 2025 and beyond timeframe.

(U) Design Analysis

- (U//FOUO) A Mod LCS (Minor) design¹ can provide the multi-mission SUW and ASW capability consistent with the Fleet's view on the most valued capabilities delivered by a small surface combatant.

(U//FOUO) A Mod LCS (Minor) design can increase lethality by providing constant SUW and ASW multi-mission capabilities, adding an over-the-horizon surface to surface missile, and supporting MH-60R with Hellfire missiles and Mk 54 torpedoes independent of mission modules installed.

(U//FOUO) Combat system upgrades to LCS Flight 0+ seaframe configurations are feasible through engineering trades and weight reduction initiatives. Notable warfighting improvements include an over-the-horizon surface to surface missile; air defense upgrades (sensors and weapons); SUW self-defense upgrades; replacing current electronic warfare (EW) systems with an advanced EW system; permanently installing underwater sensors; and permanently installing torpedo defense systems.

(U//FOUO) Modularity design features can be retained to augment SUW and ASW capabilities if needed. Mission modules include: a Longbow (Hellfire) Weapon System, 30mm guns, and 11M Rigid Hull Inflatable Boats (RHIBs) for SUW; or a variable depth sonar for ASW. (U//FOUO) Survivability features including persistent air, surface and undersea self-defense systems, increased magazine armor protection, and shock hardening of primary air defense systems provide the capabilities required to conduct independent operations in a 2025+ threat environment.

- (U//FOUO) A Mod LCS (Major) design², a New design, or a Modified Existing design is needed if a multi-mission SUW, ASW and Local Area Defense AW capability and/or higher-end vulnerability features are desired.

(U//FOUO) Providing a local area defense AW capability will enable Mod LCS (Major), New design, and Modified Existing design ships to provide limited air defense of HVUs. Higher-end sensors, weapons, and cooperative engagement systems will be required to support this capability.

¹ A Mod LCS Design (Minor) is a modified LCS design that does not require changes to the supporting HM&E systems or length, beam, or depth of the seaframe.

² A Mod LCS Design (Major) is a modified LCS design that requires lengthening the LCS seaframe (via a hull plug) to provide increased space, weight, power, and cooling.

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- (U//FOUO) Overall self-defense performance will be similar to that supported in a Mod LCS (Minor) design, with increased air self-defense performance provided by local area defense AW systems.
 - (U//FOUO) Higher-end vulnerability features including mission space and magazine armor protection; combat system shock hardening; blast hardened bulkheads; and underwater explosion (UNDEX) whipping resistance and shock hardened structure are feasible. Additionally, a New design provides the opportunity to increase separation and redundancy of critical systems.
 - (U//FOUO) Additional Mod LCS (Major), New design, and Modified Existing design features include permanent installation of Longbow (Hellfire) Weapon System, 30mm gun, and variable depth sonar mission modules, as well as increased space, weight, power and cooling margins to support future upgrades.
- (U//FOUO) None of the 23 Existing designs evaluated, including LCS variants and other foreign and domestic ship designs, could satisfy Small Surface Combatant (SSC) capability needs without design modifications to vulnerability and recoverability features equivalent to or greater than design modifications required for a Mod LCS design with similar capabilities. With modifications, an Existing design could support all eight capability concepts.

(U) Cost Analysis

- (U) A Mod LCS (Minor) has the lowest Research, Development, Test and Evaluation (RDT&E), Procurement, and Operations and Support (O&S) costs of all the design alternatives, and would maximize the operations and support investments made to date.
- (U) When compared to the cost of an LCS Flight 0+ configuration, the average follow ship cost (average cost of ships 2-20) of a more lethal and survivable multi-mission SUW and ASW small surface combatant is approximately 10% higher for a Mod LCS (Minor) design and 25% higher for a Mod LCS (Major) design. New design and Modified Existing design alternatives are approximately 40% higher.
- (U) Lead ship procurement costs for a Modified Existing design and New design increase by approximately \$350M and \$1B, respectively, when compared to a Mod LCS (Minor) design with similar mission capabilities.
- (U) Annual O&S costs for Mod LCS (Major) designs, New designs, and Modified Existing designs are approximately 30% higher than Mod LCS (Minor) designs, reflecting the additional O&S costs required for larger ship sizes (fuel), larger crew sizes (personnel costs), additional infrastructure (e.g., trainers), and additional equipment (maintenance costs).

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- (U) To provide a local area defense AW mission, an increased average follow ship cost of approximately \$100M is projected for Mod LCS (Major) design, New design, and Modified Existing design alternatives.

(U) Program Considerations

- (U) A Mod LCS (Minor) design will provide the shortest timeline to first ship delivery (FY23) and last ship delivery (FY28) with no gap in production. Additionally, a Mod LCS (Minor) design could support a subset of capability and survivability upgrades on LCS production ships as early as FY17.
- (U) A Mod LCS (Major) will deliver the first ship in FY25 and complete last ship delivery in FY29. A one year production gap is anticipated. Where design elements are applicable to an LCS Flight 0+ configuration, a subset of capability and survivability upgrades could support improvements on FY17 – 19 ships.
- (U) A New design will deliver the first ship in FY28 and complete last ship delivery in FY33, with a three to five year gap in production expected. A negative impact to the shipbuilding and supplier industrial base is also anticipated.
- (U) A Modified Existing design could potentially deliver the first ship in FY25 and complete last ship delivery in FY31, with a one to three year gap in production expected. A negative impact to the shipbuilding and supplier industrial base is also anticipated. Delays in data rights and technical data package negotiations associated with foreign designs would further exacerbate delivery timelines and industrial base implications.